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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,466	03/29/2005	Sadayoshi Horii	123373	8082
25944	7590	01/17/2007		
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER BUEKER, RICHARD R	
			ART UNIT	PAPER NUMBER
			1763	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/17/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/529,466

Applicant(s)

HORII ET AL.

Examiner

Richard Bueker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____                                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/2/05</u> .  | 6) <input type="checkbox"/> Other: ____                           |

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Claims 1-4, 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, line 4, "the other reactant" lacks proper antecedent basis and is indefinite. Claims 2, 3, 6 and 7 recite a relationship between the flow rate of the liquid and the flow rate of the vapor, but these claims do not clearly state the relationship and are therefore vague and indefinite.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Versteeg (5,451,260) (see Figs. 1 and 2), who discloses a method of manufacturing a semiconductor device (see col. 1, lines 7-11 and col. 5, lines 50-56) comprising supplying a first reactant to a substrate, supplying a second reactant to the substrate (see col. 3, lines 3-23), and repeating those steps a plurality of times, wherein both reactants contain a source gas obtained

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by vaporizing a liquid source in a vaporization section, the flow rate of the liquid source to the vaporization section is fixed per one injecting operation, and the liquid source is controlled such that it is intermittently injected to the vaporization section. Regarding claim 2, because all of the liquid that is delivered to the vaporization section is vaporized and delivered to the substrate processing section, the flow rate, in terms of mass per unit time, to the vaporization section is equal to the flow rate corresponding to one supplying operation of the source gas obtained by vaporizing in the vaporization section to the substrate.

Claims 1-3, 5-7 and 9-11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gauthier (6,132,515) (see the Fig.), who discloses a semiconductor manufacturing method comprising supplying a first reactant to a substrate, supplying a second reactant to the substrate and repeating those steps a plurality of times, wherein one reactant contains a source gas obtained by vaporizing a liquid source in a vaporization section, the flow rate of the liquid source to the vaporization section is fixed per one injecting operation, and the liquid source is controlled such that it is intermittently injected to the vaporization section. Regarding claims 2 and 3, Gauthier's system is programmed to balance the delivery of liquid into the vaporizer with the delivery of vapor out of the vaporizer and to the process chamber. Therefore, over an extended period of time, the liquid delivery rate is made equal to a flow rate of vapor corresponding to one vapor supplying operation. Regarding claim 3, over a short time period the intermittent nature of the liquid supply will cause the liquid flow rate to be smaller intermittently.

Gauthier also discloses a substrate processing apparatus comprising a processing chamber, a liquid source container, a vaporizer, a liquid supply pipe for delivering liquid to the vaporizer, a vapor supply pipe, and an injection controller for controlling the flow rate of liquid to the vaporizer to intermittently inject liquid to the vaporizer.

Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier (6,132,515) taken in view of Raaijmakers (2001/0024387) and Posa (4,747,367). Gauthier does not discuss using his vaporizer in a system for forming ALD coatings. Raaijmakers provides a disclosure of the known ALD process, and he teaches (see paragraph 91) that an apparatus such as that of Posa can be used for forming ALD layers. As shown in Figs. 1 and 2 of Posa, his reactor system is designed to form a large number of alternating layers by gas switching. Posa teaches that the vapor source used in his apparatus is a conventional vaporizer (see the vaporizer 56 of Fig. 1 of Posa) that produces a steady-state vapor flow through supply pipe 20 to the CVD reactor 22. The vapor flow into the reaction chamber 22 is switched in an alternating manner to form the gas pulses through the coating chamber. It would have been obvious to one skilled in the art to use a conventional prior art vaporizer such as that of Gauthier to supply the steady-state vapor flow that is required by Posa's coating chamber, because Gauthier teaches that his vaporizer provides a desirably steady flow of vapor. Also, because Raaijmakers teaches that Posa's apparatus can be used for an ALD process, it would have been obvious to use Posa's apparatus for ALD, while using Gauthier's vaporizer to provide the necessary steady-state vapor stream.

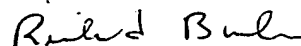
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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Richard Bueker  
Primary Examiner  
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